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PCT/KR2004/000684

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY



(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70) Rec'd PCT/PTO

28 NOV 2005

Applicant's or agent's file reference FGPE04-002	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/KR2004/000684	International filing date(day/month/year) 26 MARCH 2004 (26.03.2004)	Priority date (day/month/year) 28 MARCH 2003 (28.03.2003)
International Patent Classification (IPC) or national classification and IPC IPC7 C09K 11/71		
Applicant KOREA RESEARCH INSTITUTE OF CHEMICAL TECHNOLOGY et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising: <ul style="list-style-type: none"> a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows: <ul style="list-style-type: none"> <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application

Date of submission of the demand 20 OCTOBER 2004 (20.10.2004)	Date of completion of this report 04 JUNE 2005 (04.06.2005)
Name and mailing address of the IPEA/KR  Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer SHIN, JU CHEOL Telephone No. 82-42-481-8156 

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☒ This report is based on translations from the original language into the following language English which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3 and 23.1(b))
 - ☒ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
 - ☒ the international application as originally filed/furnished
 - ☐ the description:
 - pages _____ as originally filed/furnished
 - pages* _____ received by this Authority on _____
 - pages* _____ received by this Authority on _____
 - ☐ the claims:
 - pages _____ as originally filed/furnished
 - pages* _____ as amended (together with any statement) under Article 19
 - pages* _____ received by this Authority on _____
 - pages* _____ received by this Authority on _____
 - ☐ the drawings:
 - pages _____ as originally filed/furnished
 - pages* _____ received by this Authority on _____
 - pages* _____ received by this Authority on _____
 - ☐ the sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
 - ☐ the description, pages _____
 - ☐ the claims, Nos. _____
 - ☐ the drawings, sheets _____
 - ☐ the sequence listing (*specify*): _____
 - ☐ any table(s) related to sequence listing (*specify*): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - ☐ the description, pages _____
 - ☐ the claims, Nos. _____
 - ☐ the drawings, sheets _____
 - ☐ the sequence listing (*specify*): _____
 - ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-20	YES
	Claims		NO
Inventive step (IS)	Claims	14-20	YES
	Claims	1-13	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:

D1: JP 54-78385 A

D2: US 2002/0038861 A1

D3: US 5,839,718 A

D4: WO 00/33389 A1

1. Novelty

Claims 1, 2 and 14 relate to a strontium silicate phosphor having the formula: $\text{Sr}_{3-x}\text{SiO}_5\text{:Eu}_2+x$ (x is $0 < x \leq 1$); a preparation method thereof comprising the steps of mixing strontium carbonate, silica and europium oxide, and drying and heat-treating the mixture; and a light-emitting diode containing said phosphor. Said claims are different from D1 in that D1 contains cerium as a phosphor activator. D2-D4 contain at least one metal selected from the group consisting of Mg and Zn as a phosphor base material. D4 includes two or more elements such as barium and magnesium as a phosphor base material. Accordingly, said claims are also different from D1-D4 in the method of preparing a phosphor and the configuration of a light-emitting diode containing said phosphor.

Therefore, independent claims 1, 2 and 14 are considered to be novel (PCT Article 33(2)), and claims 3-13 and 15-20 which refer to claims 1, 2 and 14 are also considered to be novel.

2. Inventive Step

D1 describes a method for preparing a strontium silicate phosphor comprising the steps of mixing strontium carbonate, silica and cerium oxide, and heat-treating the mixture. Accordingly, the present application is different from said documents in the constituent element of a phosphor activator, that is, in the composition of a phosphor containing cerium. However, D2 and D4 describe a method for preparing a silicate phosphor by mixing silica, magnesium and strontium, and europium as an activator. In addition, there is no difference between the present application and D1 to D3 in the drying temperature and time and in the heat-treatment temperature and time.

(Continued on Supplemental Sheet.)

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Box V

Accordingly, the strontium silicate phosphor and preparation method thereof claimed in claims 1-13 can be readily invented from said prior art. However, claims 14-20 are different the prior art in that the strontium silicate phosphor is formed in the outer portion of a diode and molding-treated by a translucency resin, and in the effect of a light-emitting diode having a wide wavelength range

Therefore, claims 1-13 are considered to lack an inventive step (PCT Article 33(3)), but claims 14-20 are considered to involve an inventive step.

3. Industrial applicability

No opinion will be formulated with respect to the industrial applicability of this subject matter such as STRONTIUM SILICATE-BASED PHOSPHOR materials for display industry. (PCT Article 33(4)).